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 Approved for use through 09/30/2000. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

 Attorney Docket No. **P04589USO**
 First Inventor or Application Identifier **James A. Creighton**
 Title **Bi-Directional Cutting Or Trimming...**
 Express Mail Label No. **EL688892641US**

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages]
(preferred arrangement set forth below)
- Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets]
4. Oath or Declaration [Total Pages]
- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
- i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.33).

 ADDRESS TO: Assistant Commissioner for Patents
 Box Patent Application
 Washington, DC 20231

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee) ☐ Attorney
9. ☐ English Translation Document (if applicable)
10. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
13. ☒ Small Entity Statement(s) ☐ Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☐ Other:

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____ / Group / Art Unit: _____

Prior application information: Examiner _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label **22885** or ☒ Correspondence address below
 (Insert Customer No. or Attach bar code label here)

Name **Michael G. Voorhees**

Address **Zarley, McKee, Thomte, Voorhees & Sease, P.L.C.**
801 Grand Avenue, Suite 3200

City **Des Moines** State **Iowa** Zip Code **50309**

Country **United States** Telephone **515-288-3667** Fax **515-288-1338**

Name (Print/Type) **Michael G. Voorhees** Registration No. (Attorney/Agent) **25,715**
 Signature *Michael G. Voorhees* Date **9-20-00**

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Sept. 20, 2000
Date

Dianne L. McGarey
Dianne L. McGarey



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PTO/5B/17 (12/99)
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FEE TRANSMITTAL for FY 2000

Patent fees are subject to annual revision.
Small Entity payments must be supported by a small entity statement,
otherwise large entity fees must be paid. See Forms PTO/5B/09-12.
See 37 C.F.R. §§ 1.27 and 1.28.

TOTAL AMOUNT OF PAYMENT (\$) 345.00

Complete if Known

Application Number _____
Filing Date _____
First Named Inventor James A. Creighton
Examiner Name _____
Group / Art Unit _____
Attorney Docket No. P04589US0

METHOD OF PAYMENT (check one)		FEE CALCULATION (continued)																																																																																																																																																																																																																																			
<p>1. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:</p> <p>Deposit Account Number 26-0084</p> <p>Deposit Account Name _____</p> <p><input checked="" type="checkbox"/> Charge Any Additional Fee Required Under 37 CFR §§ 1.16 and 1.17</p>		<p>3. ADDITIONAL FEES</p> <table border="1"> <thead> <tr> <th>Large Entity</th> <th>Small Entity</th> <th>Fee Code (\$)</th> <th>Fee Code (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr> <td>105</td> <td>130</td> <td>205</td> <td>65</td> <td>Surcharge - late filing fee or oath</td> <td></td> </tr> <tr> <td>127</td> <td>50</td> <td>227</td> <td>25</td> <td>Surcharge - late provisional filing fee or cover sheet</td> <td></td> </tr> <tr> <td>139</td> <td>130</td> <td>139</td> <td>130</td> <td>Non-English specification</td> <td></td> </tr> <tr> <td>147</td> <td>2,520</td> <td>147</td> <td>2,520</td> <td>For filing a request for reexamination</td> <td></td> </tr> <tr> <td>112</td> <td>920*</td> <td>112</td> <td>920*</td> <td>Requesting publication of SIR prior to Examiner action</td> <td></td> </tr> <tr> <td>113</td> <td>1,840*</td> <td>113</td> <td>1,840*</td> <td>Requesting publication of SIR after Examiner action</td> <td></td> </tr> <tr> <td>115</td> <td>110</td> <td>215</td> <td>55</td> <td>Extension for reply within first month</td> <td></td> </tr> <tr> <td>116</td> <td>380</td> <td>216</td> <td>190</td> <td>Extension for reply within second month</td> <td></td> </tr> <tr> <td>117</td> <td>870</td> <td>217</td> <td>435</td> <td>Extension for reply within third month</td> <td></td> </tr> <tr> <td>118</td> <td>1,360</td> <td>218</td> <td>680</td> <td>Extension for reply within fourth month</td> <td></td> </tr> <tr> <td>128</td> <td>1,850</td> <td>228</td> <td>925</td> <td>Extension for reply within fifth month</td> <td></td> </tr> <tr> <td>119</td> <td>300</td> <td>219</td> <td>150</td> <td>Notice of Appeal</td> <td></td> </tr> <tr> <td>120</td> <td>300</td> <td>220</td> <td>150</td> <td>Filing a brief in support of an appeal</td> <td></td> </tr> <tr> <td>121</td> <td>260</td> <td>221</td> <td>130</td> <td>Request for oral hearing</td> <td></td> </tr> <tr> <td>138</td> <td>1,510</td> <td>138</td> <td>1,510</td> <td>Petition to institute a public use proceeding</td> <td></td> </tr> <tr> <td>140</td> <td>110</td> <td>240</td> <td>55</td> <td>Petition to revive - unavoidable</td> <td></td> </tr> <tr> <td>141</td> <td>1,210</td> <td>241</td> <td>605</td> <td>Petition to revive - unintentional</td> <td></td> </tr> <tr> <td>142</td> <td>1,210</td> <td>242</td> <td>605</td> <td>Utility issue fee (or reissue)</td> <td></td> </tr> <tr> <td>143</td> <td>430</td> <td>243</td> <td>215</td> <td>Design issue fee</td> <td></td> </tr> <tr> <td>144</td> <td>580</td> <td>244</td> <td>290</td> <td>Plant issue fee</td> <td></td> </tr> <tr> <td>122</td> <td>130</td> <td>122</td> <td>130</td> <td>Petitions to the Commissioner</td> <td></td> </tr> <tr> <td>123</td> <td>50</td> <td>123</td> <td>50</td> <td>Petitions related to provisional applications</td> <td></td> </tr> <tr> <td>126</td> <td>240</td> <td>126</td> <td>240</td> <td>Submission of Information Disclosure Stmt</td> <td></td> </tr> <tr> <td>581</td> <td>40</td> <td>581</td> <td>40</td> <td>Recording each patent assignment per property (times number of properties)</td> <td></td> </tr> <tr> <td>146</td> <td>690</td> <td>246</td> <td>345</td> <td>Filing a submission after final rejection (37 CFR § 1.122(a))</td> <td></td> </tr> <tr> <td>149</td> <td>690</td> <td>249</td> <td>345</td> <td>For each additional invention to be examined (37 CFR § 1.129(b))</td> <td></td> </tr> <tr> <td colspan="5">Other fee (specify) _____</td> <td></td> </tr> <tr> <td colspan="5">Other fee (specify) _____</td> <td></td> </tr> <tr> <td colspan="5">SUBTOTAL (1) (\$) 345.00</td> <td></td> </tr> <tr> <td colspan="2"> <p>2. 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SUBMITTED BY		Complete if applicable	
Name (Print/Type)	Michael G. Voorhees	Registration No. (Attorney/Agent)	25,715
Signature	<i>Michael G. Voorhees</i>	Telephone	515-288-3667
		Date	9-20-2000

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09/20/00

Applicant or Patentee: James A. Creighton and Dwight A. Axtell

Serial or Patent No: _____

Filed or Issued: _____

For: Bi-Directional Cutting Or Trimming Knife And Method For Using Same

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(d) AND 1.27(b)) - INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.97(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled Bi-Directional Cutting Or Trimming Knife And Method For Using Same described in: _____

☒ [X] the specification filed herewith
☐ [] application Serial No. _____, filed _____
☐ [] Patent No. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, grant, conveyed or licensed or am under an obligation under contract or law to assign, grant, convey or license any rights in the invention is listed below:

☐ [] no such person, concern or organization
☒ [X] persons, concerns or organization listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

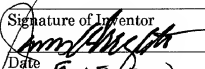
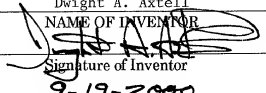
FULL NAME Amatco USA, Inc.
ADDRESS 5475 N.W. Beaver Avenue, Johnston, Iowa 50131
☐ [] INDIVIDUAL ☒ [X] SMALL BUSINESS CONCERN ☐ [] NONPROFIT ORGANIZATION

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of payment, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

James A. Creighton	Dwight A. Axtell	
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Signature of Inventor 	Signature of Inventor 	Signature of Inventor
Date <u>9-19-2000</u>	Date <u>9-19-2000</u>	Date

Applicant or Patentee: James A. Creighton and Dwight A. Axtell
Serial No. or Patent No: _____
Filed or Issued: _____
For: Bi-Directional Cutting Or Trimming Knife And Method For Using Same

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) AND 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Amatco USA, Inc.
ADDRESS OF CONCERN 5475 N.W. Beaver Avenue, Johnston, Iowa 50131

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled Bi-Directional Trimming Knife and Method For Using Same by inventor(s) Creighton and Axtell, described in

- ☒ the specification filed herewith.
☐ application Serial No. _____, filed _____
☐ Patent No. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

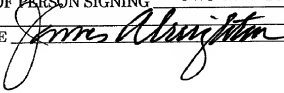
**NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.97).*

FULL NAME _____
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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of payment, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

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APPLICATION FOR UNITED STATES PATENT

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Title of Invention: **Bi-Directional Cutting Or Trimming
Knife And Method For Using Same**

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INVENTORS: James A. Creighton
Dwight A. Axtell

TITLE: **Bi-Directional Cutting Or Trimming Knife
And Method For Using Same**

BACKGROUND OF THE INVENTION

The present invention relates to a bi-directional cutting or trimming knife and method for using same.

Trimming knives have been used to trim the edges of a stack of sheet members. An example of such a use is the trimming in a bindery of the edges of bound books. Trimming knives for accomplishing this function generally move in a downward direction and in a lateral direction with respect to the sheet members being trimmed. However, prior art trimming knives generally are capable of moving only in a single lateral direction during the trimming process.

Cutting knives have been used to cut the edges of a stack of unbound sheet members. Cutting knives, like trimming knives, have generally been capable of moving only in a single lateral direction.

Therefore a primary object of the present invention is the provision of a bi-directional cutting or trimming knife and method for using same.

A further object of the present invention is the provision of a cutting or trimming knife which can be moved in a first lateral direction or in a second lateral direction during the downward movement of the knife towards the sheet members being trimmed.

A further object of the present invention is the provision of a cutting or trimming knife which is bi-directional, but which is rigidly held in proper alignment during its trimming action.

A further object of the present invention is the provision of a cutting or trimming knife which can be easily

and rapidly transferred from a first position to be movable in one lateral direction during one trimming or cutting cut, to a second position movable in another lateral direction during another trimming or cutting cut.

A further object of the present invention is the provision of a cutting or trimming knife that will not dull as quickly due to full use of the length of the knife edge.

A further object of the present invention is the provision of a bi-directional cutting or trimming knife which is economical to manufacture, durable in use, and efficient in operation.

SUMMARY OF THE INVENTION

The foregoing objects may be achieved by an apparatus for trimming or cutting a stack of sheet members having edges to be trimmed and being supported on a cutting table. The apparatus includes an elongated knife having a cutting edge extending along the cutting axis of the knife. A knife supporting frame is connected to the cutting table and a guide mechanism mounts the knife to the supporting frame for movement of the knife from a start position wherein the knife is positioned spaced from the cutting table and the sheet members to a cut position wherein the knife moves towards the cutting table and cuts or trims the stack of sheet members. The guide mechanism is movable on the frame to a first guide position causing the knife to move in a first direction relative to the cutting edge axis when moving from its starting position to its cut position. The guide mechanism is movable on the frame to a second guide position causing the knife to move in a second direction opposite from the first direction when moving from its start position to its cut position.

The guide mechanism may be a linkage which pivots during movement of the knife between its start and cut positions. However other guide mechanisms can also be used such as slots

in plates for guiding the knife. Other mechanisms also may be used for guiding the knife bi-directionally.

The method for using the knife includes cutting or trimming the first edge of the stack of sheet members by moving the cutting edge of the knife in a downwardly inclined direction extending both toward the first edge of the stack and in a first lateral direction along the knife axis until the cutting edge engages and trims the first edge of the stack of sheet members. The knife is then lifted upwardly away from the stack of sheet members. A second trimming step includes trimming the second edge of the stack by moving the cutting edge of the knife in a downwardly inclined direction extending both toward the second edge of the stack and in a second lateral direction opposite from the first lateral direction until the cutting edge engages and trims the second edge of the stack of sheet members.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWINGS

Figure 1 is a perspective view of the apparatus for trimming the sheet members.

Figure 2 is a top plan view of the linkage mechanism for controlling the movement of the knife.

Figure 3 is a view similar to Figure 2, but showing the linkage mechanism in a second position.

Figure 4 is a sectional view taken along line 4-4 of Figure 2, showing the knife in an elevated position and showing the linkage mechanism in a first position corresponding to that shown in Figure 2.

Figure 5 is a view similar to Figure 4 but showing the knife in its lowered position.

Figure 6 is a sectional view taken along line 6-6 of Figure 3, showing the knife in an elevated position, and showing the linkage mechanism in its second position corresponding to Figure 3.

Figure 7 is a view similar to Figure 6, but showing the knife in its lowered position.

Figure 8 is an enlarged detail view of the locator assembly of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings the numeral 10 generally designates the trimming machine of the present invention. While machine 10 shows the preferred embodiment, variations in the various components of the machine may be made without detracting from the invention.

Machine 10 includes a cutting table 12 having a back edge 14 and having a table recess 16 formed in its upper surface. Table slot 18 is contained within the table recess 16 and receives a book holder 20. Book holder 20 includes a holder frame 22 which supports a book holder plate 24 on the end of a rod extending from pneumatic cylinder 26. A book 28 is shown being held by the holder plate 24. Book 28 includes a spine 30. The book holder 20 is capable of holding the book 24 and moving within slot 18 to present the various edges of the board adjacent the back edge 14 of the cutting table. Device 20 is also capable of rotating about a vertical axis to present various edges of the book to the back edge 14 of the cutting table.

Extending upwardly above table 12 is a support frame 32 which is comprised of a first vertical frame member 34, a second vertical frame member 36, and a third vertical frame member 38. Members 34, 36, 38 are spaced apart so as to create a knife guide space 40 and a clamp guide space 42 therebetween. Knife guide space 40 and clamp guide space 42 are shown to be formed as spaces between spaced apart plates, but they also could be vertical grooves on the opposing inner faces of vertical legs.

Within the knife guide space 40 is a knife holder 44 which is capable of vertical sliding movement within the knife guide space 40. Within the clamp guide space 42 is a

cutting clamp 46 which is capable of sliding vertically upwardly and downwardly. A pair of clamp cylinders 49 are connected to the cutting clamp 46 for moving it from an elevated position to a lowered position. In the lowered position shown in Figure 1, the cutting clamp 46 clamps the book 28 against the upper surface of the table 12 and holds it in place for the trimming operation.

An elongated cross frame member 48 is mounted at the upper ends of the first and second vertical frame members 34, 36. Attached to the cross frame member 48 are a first guide plate 50, a second guide plate 51, a third guide plate 52, and a fourth guide plate 53. Each of the guide plates 50, 51, 52, 53 include an arcuate slot 56 therein. The cross member 48 includes a pair of elongated floor slots 58, 60 shown in Figures 2 and 3.

A linkage mechanism for supporting and controlling the movement of the knife 44 is comprised of a horizontal base link or transfer arm 62, a side link 64, and a second side link 66. As can best be seen in Figures 4 and 6, the two side links 64, 66 are pivoted at their upper ends to the opposite ends of horizontal base link or transfer arm 62 for pivotal movement about pivot points 68, 70. The lower ends of the side links 64, 66 are pivoted to the opposite ends of the knife holder 44 for pivotal movement about pivotal axes 72, 74. First, second, third and fourth guide followers or bearings 75, 76, 77, 78 (Figures 2 and 3) are positioned within the slots 56 of the guide plates 50, 51, 52, 53 respectively. These guide followers 75, 76, 77, 78 are mounted for rotational movement on a first pin 80, and a second pin 82 as can be seen in Figures 2 and 3.

A pneumatic cylinder 88 is mounted to the cross frame member 48 by means of a cylinder pin 84 extending through a hole in a cylinder mount 86 and a cylinder clevis 90. Extending from the cylinder 88 is a cylinder rod 92 (Figure 3) having a rod clevis 94 on the end thereof. The rod clevis

94 includes the pin 82 extending there through. The base link or transfer arm 62 includes a first base link clevis 96 which is mounted upon pin 80 and includes a second base link clevis 98 which is mounted upon second pin 82.

Attached to the knife holder 44 is a knife 100 (Figures 4-7) having a downwardly presented knife edge 102. A knife cylinder 104 includes a cylinder clevis 106 which connects the lower end of knife cylinder 104 to the vertical frame member 34, and includes a cylinder rod 108 having a rod clevis 110 pivotally connected to the knife holder 44.

The rod 108 of the knife cylinder 104 is extensible and retractable to move the knife holder from a raised position to a lowered position. Figures 4 and 5 show one of the two bi-directional lateral movements that can be achieved with the present invention. In Figure 4 the cylinder 88 is positioned in its retracted position. This causes base link or transfer arm 62 to move to its left position with the pivot points 68, 70 being in the left ends of the arcuate slots 56. In this position the side links 64, 66 angle downwardly and to the right from the opposite ends of base link 62. Retraction of knife cylinder 104 causes the knife holder 44 to be pulled downwardly and to the left in the direction of the arrow 112 shown in Figure 5. This causes the knife edge 102 to engage the book 28 and to trim the edge of the sheet members within the book 28. The spine 30 of the book 28 is positioned so that the knife while moving in the direction of arrow 112 moves downwardly and to the left which for purposes of reference will be referred to as "into" the spine 30. This is important because if the knife moves straight down or to the right which for purposes of reference will be referred to as "away from" the spine it will damage the spine of the book.

Attached to the vertical frame members 36 and extending horizontally therebetween is a horizontal locator frame member 116 having a pair of fixed locator blocks 118 attached

to its opposite ends. A locator bolt 120 is threaded within a block 118. A nut 122 is provided as a lock nut. On the upper end of locator bolt 120 is a cone shaped fixed locator 124.

Attached to the knife holder 44 is a knife locator block 126. The downwardly presented surface of locator block 126 includes a cone shaped receptacle 128 shaped to matingly receive the cone shaped locator 124.

When the knife 100 is moved to its lower position shown in Figures 5 and 7 the cone shaped locator 124 mates inside the cone shaped receptacle 128. The cylinder 104 remains activated to hold the two locators 124 firmly within the two receptacles 128. This maintains the knife in a precise orientation which is preferably horizontal, but which could be angular if desired. The precise orientation can be adjusted by rotating bolts 120 within block 118. The cone shaped locators 124 and the cone shaped receptacles 128 cooperate to prevent misalignment of the knife holder 44 in any direction during the transfer action.

The extension and retraction of cylinder 88 is always done with the knife in its lower position (Figures 5 and 7) seated on the cones 124. Figures 6 and 7 show the linkage mechanism in its second position. In this position the cylinder 88 is extended and this causes the base link or transfer arm 62 to move to the right so that the pivot points 68, 70 are located in the right-hand ends of the arcuate slots 56. In this position the links 64, 66 extend downwardly and to the left from the opposite ends of base link 62. A comparison of Figures 4 and 6 show that the angular direction of the links 64, 66 have been reversed from the position in Figure 4 to the position in Figure 6.

It should also be noted that the book 28 has been rotated so that the spine 30 is on the left edge of the book rather than on the right edge of the book. As the knife cylinder 104 is moved to its retracted position it causes the

knife holder 44 to move downwardly and to the right in the direction of arrow 114 to engage the book 28 and trim the edges of the sheet members in that book. As can be seen in Figures 6 and 7 this movement of the knife is downwardly and to the right into the spine 30 of the book.

The apparatus of the present invention provides a bi-directional knife which can be moved from a first position wherein the knife moves downwardly and to the left in the direction of arrow 112 (Figure 5) to a second position shown in Figure 6 where the knife moves downwardly and to the right in the direction of arrow 114 (Figure 7). This enables the trimming apparatus to use a single knife for cutting the various edges of the book whereas prior art devices required two or more knives to cut the edges so as to insure that the cutting movement is always into the spine 30.

One advantage of a bi-directional knife is that it will have a prolonged wear life over that obtained by prior art single directional knives. The book or other stack of sheet members usually is about one-half the length of the knife. A single directional knife will always use the same half of the blade to cut the sheet members. But the bi-directional knife of the present invention can be configured to use two separate and distinct portions of the knife edge for its two bi-directional modes, thereby doubling the wear life of the blade.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in the form and the proportion of parts as well as in the substitution of equivalents are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of the invention as further defined in the following claims.

What is claimed is:

1.

Apparatus for cutting or trimming a stack of sheet members supported on a cutting table, said apparatus comprising:
an elongated knife having a cutting edge extending along an elongated cutting edge axis;
a knife supporting frame connected to said cutting table;
guide mechanism mounting said knife to said supporting frame for movement of said knife from a start position wherein said knife is positioned spaced from said cutting table and said stack of sheet members to a cut position wherein said knife moves toward said cutting table and trims or cuts said stack of sheet members;
said guide mechanism being movable on said frame to a first guide position causing said knife to move in a first direction relative to said cutting edge axis when moving from said start position to said cut position;
said guide mechanism being movable on said frame to a second guide position causing said knife to move in a second direction opposite from said first direction when moving from said start position to said cut position.

2.

Apparatus according to claim 1 wherein said guide mechanism comprises a linkage mechanism.

3.

Apparatus according to claim 2 wherein said linkage mechanism includes an elongated base link, a first link pivotally connected to said base link and said knife, and a second link pivotally connected to said base link and said knife.

4.

Apparatus according to claim 3 and further comprising a linkage power means connected to said linkage mechanism for

12.

Apparatus according to claim 11 wherein said first and second stop members retentively engage one another when said knife is in said cut position to hold said knife against movement when in said cut position.

13.

Apparatus for trimming or cutting a stack of sheet members supported on a cutting table, said apparatus comprising:
a support frame connected to said table and extending upwardly therefrom;
linkage mechanism comprising a base link and first and second side links pivotally connected to said base link and extending downwardly therefrom;
an elongated knife holder having an elongated knife with a cutting edge mounted thereto, and being pivotally connected to said first and second side links, whereby said base link, said first and second side links, and said knife holder form a collapsible parallelogram;
an extensible cylinder connected to said frame and to said knife holder for moving said knife from a start position spaced above said sheet members to a cut position engaging and cutting through said sheet members;
said base link being movable mounted to said support frame for movement from a first link position wherein said first and second links angle downwardly at an inclined first angle when said knife is in said start position to a second link position wherein said first and second links angle downwardly at an inclined second angle opposite from said first angle when said knife is in said start position.

14.

A method for using a knife having a longitudinal knife axis and a cutting edge to cut or trim a stack of sheet

members supported on a table and having at least first and second edges to be cut or trimmed, said method comprising: trimming or cutting said first edge of said stack by moving said cutting edge of said knife in a downwardly inclined direction extending both downwardly toward said first edge of said stack and laterally in a first lateral direction along said knife axis until said cutting edge engages and cuts through said stack of said sheet members;

lifting said knife upwardly away from said stack of sheet members;

trimming or cutting said second edge of said stack by moving said cutting edge of said knife in a downwardly inclined direction extending both downwardly toward said second edge of said stack and laterally in a second lateral direction opposite from said first lateral direction until said cutting edge engages and cuts through said stack of sheet members.

15.

A method according to claim 14 wherein said stack of sheet members comprises a book having a spine edge extending between said first and second edges to be trimmed, said method comprising rotating said book 180 degrees between said trimming of said first and second edges of said stack, whereby said first and second lateral directions will both extend into said spine edge of said book.

16.

A method according to claim 15 and further comprising clamping said book to said table during said trimming of said first and second edges of said stack.

17.

A method according to claim 14 and further comprising a base link, a first side link and a second side link pivotally connected to said base link and said knife so as to create a collapsible parallelogram from said base link, said first and

second side links and said knife, said method comprising moving said base link in a direction parallel to said cutting edge of said knife from a first link position during said trimming of said first edge of said stack to a second link position during said trimming of said second edge of said stack.

18.

A method according to claim 17 and further comprising holding said knife stationary during said moving of said base link from said first link position to said second link position.

19.

A method according to claim 18 and further comprising using at least one guide track to guide a guide follower attached to said base link during movement of said base link from said first link position to said second link position.

20.

A method according to claim 19 and further comprising guiding a guide follower attached to said base link in an arcuate path during movement of said base link from said first link position to said second link position.

ABSTRACT OF THE DISCLOSURE

A cutting or trimming knife for cutting or trimming the edges of sheet members is bi-directional and capable of moving downwardly and in a first lateral direction, or alternatively downwardly and in a second opposite lateral direction. The knife is held by a guide mechanism capable of shifting between first and second positions to cause the bi-directional movement of the knife.

14

096973-0500

Our residences, post office addresses and citizenships are as stated below next to our names. We believe we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled as follows: **Bi-Directional Cutting Or Trimming Knife And Method For Using Same**, the specification and drawings of which are attached hereto.

We hereby state that we have reviewed and understand the contents of the above identified specification and drawings, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code Of Federal Regulations, Section 1.56. We further declare that no application for patent or inventor's certificate on this invention has been filed by us, our legal representatives or assigns in any country foreign to the United States of America except as identified below:

Applicants hereby appoint the attorneys of record listed under **Customer No. 22885** at ZARLEY, McKEE, THOMTE, VOORHEES & SEASE, 801 Grand Avenue, Suite 3200, Des Moines, Iowa 50309-2721 (telephone number 515-288-3667 and fax number 515-288-1338), as our attorneys to prosecute this application and to transact all business in the Patent Office connected therewith.

Please direct all correspondence to the attention of Michael G. Voorhees, Zarley, McKee, Thonke, Voorhees & Sease, 801 Grand Avenue, Suite 3200, Des Moines, Iowa, 50309-2721 (telephone number 515-288-3667).

We hereby declare that all statements made herein are of our own knowledge and true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false

statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURES

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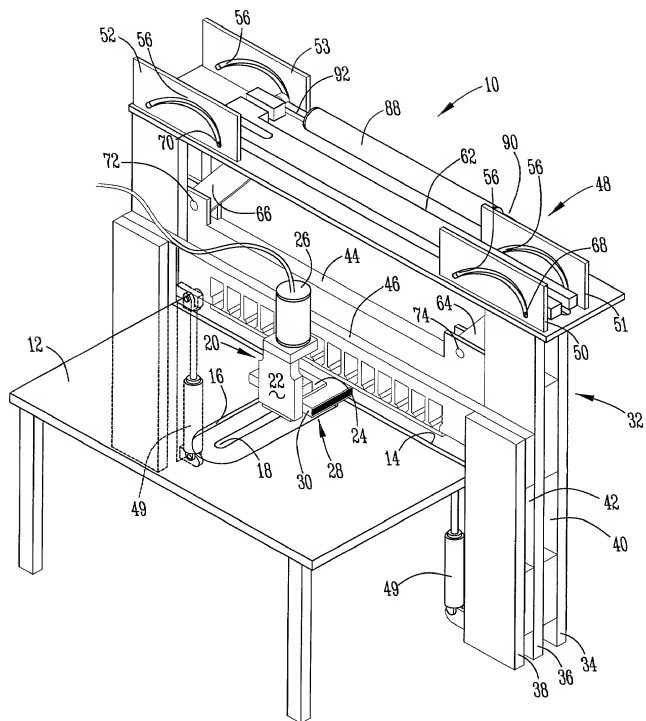


Fig. 1

